

the maximum competitive flexibility to ESMR providers. The president of Fleet Call stated that he expected the ESMR system to be useable both in vehicles and as portable equipment with features similar to PCNs.<sup>2</sup> I expect the FCC to allow other carriers to establish ESMR in other U.S. locations in the near future. Thus, ESMR will provide a close substitute to cellular service which will increase overall competition.

## II. DEREGULATION OF CELLULAR SERVICE IS IN THE PUBLIC INTEREST

### A. Economic Rationales for Regulation

#### 14. Q. What are the rationales for regulation?

A. To an economist three primary reasons exist for regulation. The first reason is the efficiency rationale: a given industry may be a "natural monopoly" in the sense that a single firm can produce the goods and services provided by the industry at a lower cost than can a group of competing firms. The second reason for regulation occurs when the structure of the industry, because of cost (supply) factors, demand factors, or the presence of externalities would cause competition to work poorly. Regulation of the banking industry where deposits are guaranteed by the U.S. government falls into this second category. The third reason for regulation occurs when important externalities or social policy goals exist. Thus, regulation of telephone companies to provide universal service with the goal of providing low price basic telephone service for low income families is justified based on externalities and social policy goals.

#### 15. Q. Could cellular be a "natural monopoly"?

A. Cellular has none of the features which can create a natural monopoly. In the single output case, a natural monopoly occurs when average cost decreases as output increases over any possible range of demand. What economists call minimum efficient scale, the lowest point on the average cost curve, then

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<sup>2</sup> Telecommunications Reports, February 18, 1991, p. 7.

becomes equal to the entire market. Thus, the service can be produced at minimum cost when a single firm produces all of the output.

To the contrary, the technology of cellular is such that economies of scale are exhausted at levels of output which are much smaller than the entire market. As demand grows, capacity is increased by "splitting cells" which leads to either constant or increasing marginal (incremental) cost. In all cellular markets of any reasonable size, I expect to see two economically viable facilities providers, as allowed by the FCC. Certainly, economic evidence to date demonstrates that no natural monopoly characteristics exist in the cellular industry.<sup>3</sup>

16. Q. Is regulation required because cellular markets work poorly?  
A. Some form of regulation may be appropriate if competition works poorly. Competition may work poorly when cost (supply) or demand conditions are such to allow firms to have significant market power.<sup>4</sup> An example of such circumstances is provided by a nuclear power plant where cost conditions are such to cause competition to work poorly. In these circumstances, the question then becomes whether regulation can do better than economic markets in terms of establishing the appropriate prices and quality levels for a product or service. It is important, however, to establish the operative question in discussing regulatory goals. While the presence of a duopoly situation for wholesale service, as established by the FCC, and cellular technology, rules out the market structure of many small, individually insignificant, competitors (i.e. perfect competition), the NCUC should decide

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<sup>3</sup> This experience is especially important, given the substantial "headstart" that Block B carriers had in many cellular markets where the wireline (Block B) began operation before the non-wireline (Block A) carrier. The competitive evolution of cellular markets demonstrates that the non-wireline carriers have suffered no lasting competitive disadvantage.

<sup>4</sup> The presence of market failure caused by externalities is not a potential problem for cellular telephone service. Furthermore, it should be noted that market shares in the cellular industry provide no indication of potential market power since the FCC has permitted only two facilities based carriers to provide cellular service in each cellular market.

whether regulation is likely to achieve a better economic outcome than the market outcome in the absence of regulation. Thus, a real world analysis provides the proper framework, rather than a reference to a theoretical ideal of perfect competition or perfect regulation. My analysis, which I discuss below, leads me to conclude that competition in cellular markets is likely to benefit consumers more than regulation which limits the competitive activities which a cellular firm can undertake.

17. Q. Do important externalities or social policy goals exist which would require regulation of cellular in North Carolina?

A. No. The public telephone network fulfills the social policy goals of universal service. It also accounts for the possible externality of the benefits of being able to reach other individuals since telephone penetration is extremely high in North Carolina. Cellular telephone does not have any role to play in these considerations. Also, cellular service is a complement, not a substitute, to the public network so that cellular service has no harmful effect on the operation and affordability of telephone service in North Carolina.

B. Current Regulation of Cellular in North Carolina and in other States

18. Q. Have you considered the current regulatory framework for cellular in North Carolina?

A. Commission approval is required for any change in prices. Cellular service providers must file tariffs with the Department and give 30 days advance notice of any change in services or price plans. Furthermore, special promotions are also required to be announced with 14 days notice and competitors typically have advance notice of such promotions. Even lowering rates requires 14 days notice before the change takes place. The requirement for advanced filing of tariff changes or special promotions is likely to decrease competition. Indeed, in unregulated markets both economists and the

antitrust authorities have often determined that advanced notice to competitors of future price changes serves an anti-competitive purpose. Thus, deregulation which would eliminate the advanced notice provisions would likely cause an increase in competition.

19. Q. How do other states regulate cellular?

A. About 27 states, and the District of Columbia, do not regulate cellular service in terms of prices.<sup>5</sup> Maryland continued deregulation of cellular after a recent study investigating current competitive conditions in that state. New York has recently streamlined regulation so that price changes within a pre-approved tariff range can be made on only one day's notice. No state has either rate of return regulation or price caps for cellular. Thus, even states which continue to regulate cellular have recognized that competitive conditions eliminate the need for traditional types of rate based rate of return regulation used for local telephone companies.

C. Deregulation of Cellular Markets is Consistent with Increased Competition Compared to Regulation

20. Q. How do cellular prices compare across states when differences are accounted for?

A. I have conducted an econometric study based on data collected in a telephone survey, conducted in January 1991, of the 30 largest cellular markets in the U.S. The results of the study are given in Exhibit 2. In the study I consider the minimum monthly bill based on average industry usage (160 minutes/month with 80% peak usage) across all the cellular carriers. As explanatory variables in the regression specification I use the MSA population, average income, average commuting distance, the year when the carrier began operation, and an indicator variable for whether the state regulates cellular prices. My results indicate that price regulation does not

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<sup>5</sup> This information is obtained from the CTIA June 1991 Regulatory Update.

lead to lower cellular prices, and indeed, the econometric estimates are that prices are about 5-15% higher in states which regulate cellular prices.<sup>6</sup> Thus, analyses of cellular prices demonstrates that regulation does not lead to lower prices for consumers. If anything, allowing market forces to determine cellular prices totally leads to lower prices for consumers.

D. Regulation Negatively Affects Technological Innovation

21. Q. How does current regulation affect incentives for technological innovation?

A. The current form of cellular service regulation in North Carolina limits the correct incentives for technological innovation. Carriers should have the incentive of greater profits if they introduce successful innovations which are valuable to cellular customers. Of course, customers also share the benefits of technological innovation in cellular service, as they do in all cases of technological advance. Cellular service providers are willing to take the risk of technological innovation since they will receive higher economic return for successful technological advances. Unfortunately, in North Carolina the current form of regulation may inhibit technological and service innovations because competitors can protest and delay the offering of new innovative services. Economic markets work best when competitors are unable to delay or impede each others' competitive actions.

22. Q. Does the evolving technology of cellular require a flexible regulatory framework?

A. Yes. The evolution of technology in cellular telephony is very rapid with considerable uncertainty. A flexible regulatory framework is necessary to cope with the expected changes in the near future. To date, cellular has used

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<sup>6</sup> This comparison holds the other economic factors, e.g. population, constant so that the effect of regulation can be considered by itself.

analog radio technology which was mainly developed in the 1950's and 1960's. However, in many areas of the country, e.g. the New York City metro area, available spectrum for cellular is reaching the saturation point. Thus, the cellular industry has begun the evolution from an analog to a digital based technology. The change in technology will increase spectrum usage from between 3-20 times the current technology. However, considerable investment will be required to change over from analog to digital technology. Furthermore, two competing digital technologies for digital cellular, time division (TDMA) technology and spread-spectrum technology (CDMA) are both being currently tested for the next generation of cellular technology. Cellular companies will need the maximum flexibility to meet the changes in technology. Besides the required investment in the new technology and the ability to run a hybrid analog-digital system during the transition period, the cellular carriers will also need great flexibility to reprice their services given the markedly increased capacity the systems will have. Thus, the changing cellular technology is another important reason for deregulation.

E. Regulation is Not Necessary to ensure Quality or to Protect Consumers from Predation or Other Anti-competitive Behavior

23. Q. Is regulation needed to ensure sufficient quality levels for cellular service?

A. Competition, not regulation, is usually the best method to ensure proper quality of service levels. To date in North Carolina, competition between the two cellular service carriers in each MSA has done a good job of ensuring a high quality level for cellular. Regulation has not had a noticeable impact on cellular service quality levels. Few customer complaints exist with respect to service quality. Since customers can shift from one carrier to the other at little or no cost, competition will cause each carrier to offer high quality service or risk losing significant market share.

24. Q. Is rate regulation needed to avoid predation and anti-competitive behavior in cellular markets?

A. No, since no different incentives exist in cellular markets than exist in unregulated markets for most goods and services in the U.S. economy. No incentive for cross-subsidy currently exists in North Carolina under the current industry structure. The idea behind cross-subsidy is that a facilities provider will sell its downstream (retail) services below cost, using the profits from the upstream (wholesale) activity to finance the below cost operation. Note that such an action makes no economic sense unless competitors can be driven out of downstream markets and be kept out when the firm subsequently raises its prices above competitive levels to recoup the money it lost. This activity is the standard description of economic predation.

Most economists, and increasingly the federal courts, have been skeptical of predation. The U.S. Supreme Court in a recent decision stated that "predatory pricing schemes are rarely tried, and even more rarely successful."<sup>7</sup> The reason why predation is such a rarely attempted action is that when the predator attempts to raise its price to a supracompetitive level, other firms will enter the industry and force the price back down to competitive levels. In the downstream retail industry where barriers to entry are absent, attempted predation or cross-subsidy cannot make sense because of the mandated resale policy of the FCC.

In a hypothetical situation suppose that cellular carrier ABC succeeded in cross-subsidy of its downstream operations to the extent that other retailers and resellers exited the market. As soon as the carrier attempted to raise retail prices both resellers and retail agents of the other cellular carrier, XYZ, would re-enter the market. And since customers can shift among carriers and resellers at very low cost, the customers gained during the predatory period would soon be lost if the ABC carrier attempted to charge above market prices. Thus, not only would the ABC carrier not get much new

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<sup>7</sup> Matsushita v. Zenith Radio, 1986, 475 US 574, 589.

business, it would also lose much of its existing market share. Furthermore, carrier ABC would lose substantial amounts of money during the below-cost pricing period when it was forcing retailers and resellers to exit the market which it could not recover.

F. Forbearance from Regulation Will Increase Competition

25. Q. Can the current form of regulation cause decreased competition?

A. Yes, since it can decrease the range of competitive strategies that a carrier will be willing to undertake. Given the national recession and the slowdown in new cellular customers, promotional strategies may become increasingly important and lead to lower prices for consumers. But regulation in North Carolina requires giving advanced notice to your competition, here 14 days' notice of a rate change. The competitor can then either delay or even stop such pro-competitive actions; or even more likely, it will implement the same or a similar program depriving the initial firm from making significant competitive gains. In non-regulated markets in the U.S. competitors do not give advanced notice of price cuts or they may well run afoul of the antitrust laws. Here consumers would be better off if competitors could explore the entire range of competitive options. Regulation can also lead to decreased competition for additional discounts for large customers and government or industry groups. Again, competition would be better served without these requirements.

26. Q. Can regulation inhibit the introduction of new services?

A. Regulation can make the introduction of new types of services more costly. Economic research demonstrates that successful introduction of new innovative services often leads to the greatest increases in consumer welfare. Thus, encouragement of new and innovative services should receive the highest priority. For instance, residential users of cellular are still few in number. A possible pricing plan which would charge markedly lower prices in lightly used cells might well encourage greater utilization of cellular by

customers. However, establishing the best prices for such a plan would likely require significant experimentation since such a plan has not been implemented previously. The current regulatory framework in North Carolina inhibits such experimentation.

F. "Bundling" Causes Lower Prices for Consumers and Is Not Anti-Competitive

27. Q. Does "bundling" of cellular equipment and cellular service harm competition?

A. The joint provision of cellular equipment and cellular service increases competition, especially since a consumer can always purchase cellular service alone without purchasing equipment. Joint provision of equipment and service leads to lower prices for equipment for consumers and has accelerated the adoption of cellular services. Thus, consumers are made better off because they can buy equipment at lower prices and have a greater choice of options. Joint provision is pro-competitive. Agents complaints here do not make economic sense because no barriers to switching exist in cellular. Thus, agents are complaining about a pro-competitive and pro-consumer business practice which exists in unregulated industries as well. The high level of competition created by the joint provision of equipment and service demonstrates that competitive service offerings are being provided. Curtailment of these competitive service offerings would make consumers worse off since they would face higher prices and fewer people would use cellular service.

III. CONCLUSION

28. What are your conclusions?

A. The provision of cellular service is competitive in North Carolina. No economic rationale exists for regulation of cellular service. Given that: (1) Cellular prices are lower in deregulated states; (2) Regulation adversely affects technological innovation; (3) Regulation is not necessary to ensure

sufficient quality or to stop anti-competition actions; and (4) Forbearance from regulation will increase competition, I conclude that deregulation of cellular service in North Carolina is in the public interest.

29. Q. Does this conclude your testimony?

A. Yes, it does.

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Reviewer, Mathematical Reviews, 1978-1980  
American Editor, Review of Economic Studies, 1979-82  
Associate Editor, Journal of Public Economics, 1982-  
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Member of MIT Energy Laboratory Policy Research Group, 1973-  
Research Associate, National Bureau of Economic Research, 1979-  
Member, American Statistical Association Committee on Energy Statistics, 1981-1984  
Special Witness (Master) for the Honorable John R. Bartels, U.S. District Court for the Eastern District of New York in Carter vs. Newsday, Inc., 1981-82  
Member of Governor's Advisory Council (Massachusetts) for Revenue and Taxation, 1984-  
Member, Committee on National Statistics, 1985-1990  
Member, Committee to Revise U.S. Trade Statistics 1990-  
Director, MIT Telecommunications Economics Research Program, 1988-  
Board of Directors, Theseus Institute, France Telecom University, 1988-

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# PRICE REGRESSION FOR TOP 30 CELLULAR MARKETS

Left Hand Side Variable: Log of Price<sup>1</sup>

<u>Variable</u>	<u>Estimate</u>	<u>Standard Error</u>
1. Intercept	2.03	0.58
2. Log of Income <sup>2</sup>	0.354	0.258
3. Log of Population <sup>3</sup>	0.059	0.050
4. Log of Commute Time <sup>4</sup>	0.349	0.172
5. Regulation	0.146	0.051
6. Wireline	0.017	0.046
Number of Observations	45	
Standard Error of Regression	.156	
R Squared	.485	

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<sup>1</sup> Minimum monthly bill based on 128 minutes of peak calling and 32 minutes of off-peak calling.

<sup>2</sup> Log of per capita personal income. Source: DRI.

<sup>3</sup> Log of population. Source: DRI.

<sup>4</sup> Mean commuting time to work (not via public transportation). Source: 1980 Census of Population.

### APPENDIX 3

**A REPORT ON CELLULAR TELEPHONE SERVICE  
IN MARYLAND**

**SEPTEMBER, 1990**

**JOINT CHAIRMAN'S REPORT**

**PAGE 14**

**DIVISION OF RATE RESEARCH AND ECONOMICS  
PUBLIC SERVICE COMMISSION OF MARYLAND**

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## I. EXECUTIVE SUMMARY

This report has been prepared by the Maryland Public Service Commission (MDPSC or Commission). This study will examine the cellular telephone industry in Maryland. The Commission was requested to examine the current rate structure for cellular telephones, the impact of competition on rates, and the potential need for regulation. The major issue addressed by this report is what, if any, type of regulation is appropriate for the cellular telephone industry operating in Maryland. Maryland is one of 26 states which does not regulate cellular telephone providers as of June, 1990. In general, the appropriate form of regulation will depend largely upon whether an unregulated market for a product or service approximates perfect competition. This report describes the Maryland cellular telephone market and how the cellular telephone providers have been regulated and how the form of regulation has changed over time.

The report concludes that the cellular telephone service industry provides a service that is not now considered essential to most telephone users. Given that there are or will be at least two competitors in each territory in which the service is provided, there is no justification for regulating the industry. Evidence confirms that the cellular telephone providers operating in

Maryland are acting competitively by improving service and lowering prices. Furthermore, a majority of the states have deregulated or vastly reduced regulation of cellular service. This experience supports the conclusion that regulation is not required to protect the public interest.

The report is organized in the following manner. Section 2 discusses cellular telephone service while Section 3 contains a brief analysis of the structure of the cellular telephone industry. Section 4 reviews the history of cellular telephone service regulation in Maryland at the state and federal level and also describes the regulation of cellular telephone providers in other states. Sections 5 and 6 pertain to the conduct of the firms in this industry and the performance of these firms. The final section of the report contains a summary of conclusions.

## II. INTRODUCTION

Cellular radio telephone service is a relatively new mobile telephone system that increases the service area of mobile phones and enhances the clarity of mobile telephone messages. In the past, mobile communication was limited by the number of channels of the radio spectrum made available for this service in a particular city. "In a cellular radiotelephone system, large service areas are divided into honeycomb-shaped segments or 'cells' - each of which is equipped with a low-power transmitter or base station, receiving and radiating messages within its parameters. Each transmitter can handle 333 calls at a time. When a caller dials a number on a cellular mobile telephone, a transceiver sends signals over air on a radio frequency to a cell site. From there the signal travels over phone lines or a microwave to a computerized mobile telephone switching office (MTSO). To enable a caller to move from one area to another, without interrupting the signal, the MTSO automatically and inaudibly switches the conversation from one base station and one frequency to another, as the vehicle or the portable telephone subscriber moves from cell to cell. The MTSO records the phone number to be billed as it transfers each call."<sup>1</sup>

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<sup>1</sup> The Mobile Communications Industry Guide, Telocator  
(The Mobile Communications Industry Association), 1989,  
p. 792.